

### Trend Study 21-10-03

Study site name: Wide Canyon DWR.

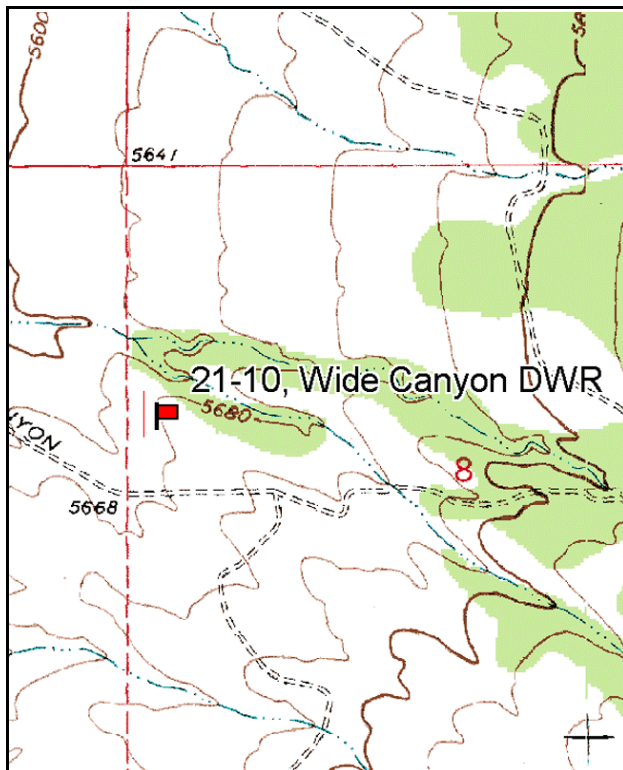
Vegetation type: Cliffrose Chaining.

Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

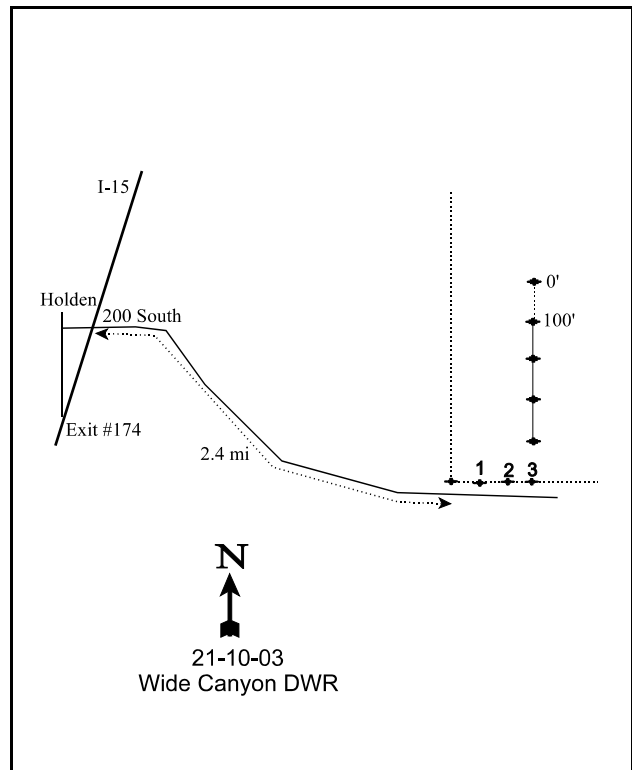
### LOCATION DESCRIPTION

From the south Holden exit off I-15, go north into town and turn right at 200 South. Follow the road 1 block east, then north a few yards, then immediately east again up the hill to an overpass. From the overpass go 2.4 miles east to the fence corner of DWR property. Not including the corner posts, count to the third wooden post to the east. Measure 100 feet due north of the fence to the 400-foot stake. The 0-foot stake is a 2 foot tall fencepost marked by browse tag #7070. The other stakes are rebar.



Map Name: Coffee Peak

Township 20S, Range 3W, Section 8



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4327282 N, 394437 E

## DISCUSSION

### Wide Canyon DWR - Trend Study No. 21-10

This study samples important deer winter range on land owned and managed by the Utah Division of Wildlife Resources. This site, like much of the area along the west side of the Pahvant Range, was cabled, chained and/or hula dozed in the late 1950's. The range type is currently an association of Utah juniper, Wyoming big sagebrush, cliffrose, and a perennial grass understory. The site slopes to the west at 5-10%, and elevation is 5,640 feet. This site is an important wintering area for big game, primarily mule deer. The DWR Wide Canyon deer pellet group transect, located approximately 1 mile to the east of the trend study, showed a 5 year average of 56 deer days use/acre (138 ddu/ha) between 1981 and 1985 (Jense et al. 1985). Between 1985 and 1991, the average went down slightly to 52 deer days use/acre (128 ddu/ha) (Jense et al 1991). Pellet group data taken along the study site baseline estimated 122 deer, 5 elk, and 9 cow days use/acre (301 ddu/ha, 12 edu/ha, and 22 cdu/ha) in 1998. In 2003, deer use was estimated at 165 days use/acre (407 ddu/ha) while cattle use was estimated at less than 2 days use/acre (4 cdu/ha). No elk pellets were sampled in the transect in 2003. The cattle use in 2003 was recent, with deer use being from the preceding winter and spring.

The soil is sandy, shallow, and rocky with a hardpan at a depth of about 12 inches. Effective rooting depth was estimated at just over 10 inches in 1998. Soil texture is classified as a loam with a neutral pH (7.0). Due to the rocky nature of the soil, average soil temperature averaged between 70-81°F in 1998 and 2003. This condition causes excessive dry soils during the summer, which gives winter annuals like cheatgrass a competitive advantage especially under a spring grazing system. It was noted that erosion and sedimentation were evident on areas with exposed soils or a sparse layer of litter cover. However in 2003, erosion was minimal and a condition class assessment rated soils as stable. This study has maintained higher perennial grass abundance and cover compared to the other range trend studies along the west side of the Pahvant Range.

Browse composition is similar to the other sites in the area, but Utah juniper is more prevalent. Point quarter data from 2003 estimated 54 juniper trees/acre on the site. Juniper canopy cover averaged about 3% in both 1998 and 2003. A hand cutting treatment on juniper was done sometime between 1998 and 2003. The key browse species are Wyoming big sagebrush and Stansbury cliffrose. Antelope bitterbrush has also been sampled in low numbers. These three species combine to provide over 80% of the total browse cover on the site in 1998 and 2003. A few of the sagebrush on the site fluoresced under a black light indicating some hybridizing between Wyoming big sagebrush and mountain big sagebrush. Wyoming big sagebrush is the most abundant of the key species having a stable density that averaged 2,400 plants/acre between 1985 and 1998. In 2003, sagebrush density decreased by 50% to just over 1,000 plants/acre. Decadent sagebrush were abundant in 1998, and the population decline in 2003 is due mainly to many of these individuals dying off. With low sagebrush reproduction in 1998 and 2003, the population has not been able to replace the decadent, dying individuals being lost. Utilization on big sagebrush has been mostly light to moderate in all readings. Heavy use occurs on a few individuals that display more characteristics of mountain big sagebrush which is more preferred. Beginning with the 1991 reading, about 20% of the population has been classified as having poor vigor. Percent decadence has been high in all years, but especially so in 1998 and 2003 when it was 57% and 52% respectively.

The cliffrose population has been stable since site establishment. Density was estimated at 200 plants/acre in 2003, a slight decrease from 260 in 1998. Cliffrose has been moderate to heavily utilized in all years, but has maintained normal vigor. Although the entire population was classified as decadent in 1991, percent decadence was much improved in 1998 (31%) and 2003 (10%). The cliffrose population has shown very little reproduction over the life of the transect. Bitterbrush density was estimated at 40 plants/acre in 1998, increasing to 140 plants/acre in 2003. With no young plants sampled in 1998, the increase in density may be

due more to identification differences with young cliffrose. In 2003, annual leaders averaged 1.3 inches for sagebrush, 2.8 inches for cliffrose, and 3.1 inches for bitterbrush.

As noted above, perennial grasses are more abundant on this site compared to the other range trend studies in the area. The common species include Sandberg bluegrass, bluebunch wheatgrass, intermediate wheatgrass, and bulbous bluegrass. Crested wheatgrass is also present but has slowly declined with each reading. Perennial grasses provided 21% total cover in 1998, increasing to 31% in 2003. Most of this increase was due to the significant increase in bulbous bluegrass between 1998 and 2003. This species is a low value perennial that provides little forage value, especially during summer months as it dries out early. In earlier readings, utilization was light to moderate on the majority of the grasses, with the exception of Sandberg bluegrass which was heavily utilized in 1985 and vigor was depressed on 70% of the plants. Use on grasses was light in 2003. Due to the abundance of perennial grasses, annual cheatgrass is conspicuously lacking in the understory. This is somewhat surprising since cheatgrass dominates the understory of a nearby transect, Wide Canyon BLM (21-9). The major difference between these two sites is that the DWR site has a very healthy and robust population of perennial grasses that is very competitive and keeps cheatgrass in check at very low numbers. Similar to the Wide Canyon BLM study, perennial forbs are deficient. All forbs combined to produce less than 1% total cover in both 1998 and 2003.

#### 1985 APPARENT TREND ASSESSMENT

General range trend may be downward. The soil, already shallow and low in fertility, is being slowly eroded away, especially where exposed and disturbed. Vegetative trend appears down because of the increasing dominance of junipers, high density and increase of snakeweed, high percentage of decadent key species, and lack of forbs. Chaining and seeding could be beneficial to this area.

#### 1991 TREND ASSESSMENT

Pavement cover has decreased from 13% to 4%. Basal vegetative cover has also declined from 8% to 5%. Percent bare ground cover has increased substantially (14% to 22%). Litter cover increased slightly. Overall trend would have to be considered slightly down with the losses in vegetational basal cover and the increases in bare ground. The two key browse species, Wyoming big sagebrush and cliffrose, are showing downward trends. The sagebrush population has declined by 8% (down to 2,399 plants/acre) with an accompanying increase in percent decadency (33% to 36%). The young age class makes up only 6% of the population, down from 18%. The cliffrose population is basically stagnant with only 133 plants/acre, and percent decadence has doubled from 50% to 100%. There are no young cliffrose plants in the population. In 1985, it was thought that broom snakeweed appeared to be increasing. In 1991, the population actually decreased by 77%. The trend for key browse is slightly down, showing the effects of long-term drought. The herbaceous understory trend is up. The sum of nested frequency for grasses has increased by one and a half. There are not many forbs, but they too increased slightly since 1985.

#### TREND ASSESSMENT

soil - slightly down (2)

browse - slightly down (2)

herbaceous understory - up (5)

#### 1998 TREND ASSESSMENT

Trend for soil is up slightly with a two-fold decline in percent bare ground (22% to 11%) since 1991. However, litter cover also declined from 66% to 57%. Erosion is not currently a problem on this site. Trend for browse continues to be downward for Wyoming big sagebrush, but cliffrose displays an improving trend.

Sagebrush shows more moderate use, a higher proportion of plants in poor vigor, increasing decadence, and a lack of significant recruitment. The number of dead plants is also quite high at 900 plants/acre. Another indication of downward trend is that 34% (420 plants/acre) of the decadent sagebrush were classified as dying. Cliffrose on the other hand shows reduced decadence and lighter overall use. Vigor is good and there is some limited recruitment present. Since sagebrush accounts for 58% of the browse cover or 87% of the preferred browse cover, trend for browse is considered slightly down. This trend is likely caused primarily by competition with increasing juniper trees and a healthy perennial grass component. Trend for the herbaceous understory is slightly up due to an increase in the sum of nested frequency for perennial grasses. Unfortunately, much of the increase comes from a significant increase in the less desirable bulbous bluegrass. Intermediate wheatgrass also increased significantly in nested frequency. Forbs continue to be lacking.

#### TREND ASSESSMENT

soil - slightly up (4)

browse - slightly down (2)

herbaceous understory - slightly up (4)

#### 2003 TREND ASSESSMENT

Trend for soil is stable. Overall, protective ground cover remains stable, and bare soil is only slightly higher than in 1998. Although litter cover declined from 57% to 48%, perennial grass cover increased by nearly 50% which will greatly aid soil stability. Trend for browse is down. Wyoming big sagebrush density decreased by 50%, percent decadence remains very high (52%), use is increasing, and there is no reproduction in the population. Nearly 40% of the decadent sagebrush were classified as dying. With no young plants being sampled in 2003, the sagebrush population will likely show further declines in the future. Cliffrose remains at a stable but low density. Cliffrose also had no reproduction in 2003. Use is increasing to higher levels. Trend for the herbaceous understory is stable. Sum of nested frequency for perennial grasses slightly increased overall, although composition is changing. Bulbous bluegrass significantly increased in nested frequency, while intermediate wheatgrass, Sandberg bluegrass, and crested wheatgrass all decreased. Bluebunch wheatgrass remained stable in 2003. The low abundance of annual species continues to be a positive sign for this site.

#### TREND ASSESSMENT

soil - stable (3)

browse - down (1)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --  
Management unit 21 , Study no: 10

T y p e	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
G	Agropyron cristatum	<sub>b</sub> 24	<sub>b</sub> 24	<sub>ab</sub> 18	<sub>a</sub> 1	.29	.06
G	Agropyron intermedium	<sub>ab</sub> 67	<sub>a</sub> 66	<sub>c</sub> 144	<sub>b</sub> 92	5.27	4.63
G	Agropyron spicatum	140	181	172	188	6.10	9.59
G	Bromus tectorum (a)	-	-	40	52	.17	.82
G	Oryzopsis hymenoides	-	3	-	-	-	-
G	Poa bulbosa	<sub>a</sub> -	<sub>b</sub> 99	<sub>c</sub> 158	<sub>d</sub> 271	5.06	13.61
G	Poa secunda	<sub>ab</sub> 135	<sub>b</sub> 157	<sub>ab</sub> 129	<sub>a</sub> 106	4.01	2.42
G	Sitanion hystrix	6	2	10	5	.04	.03
Total for Annual Grasses		0	0	40	52	0.17	0.81
Total for Perennial Grasses		372	532	631	663	20.80	30.36
Total for Grasses		372	532	671	715	20.97	31.18
F	Alyssum alyssoides (a)	-	-	<sub>b</sub> 47	<sub>a</sub> 25	.20	.06
F	Astragalus calycosus	-	-	3	2	.03	.03
F	Astragalus spp.	-	6	-	2	-	.03
F	Castilleja chromosa	-	2	-	-	-	-
F	Calochortus nuttallii	<sub>ab</sub> 2	<sub>b</sub> 7	<sub>a</sub> -	<sub>a</sub> -	-	.00
F	Collinsia parviflora (a)	-	-	<sub>a</sub> 10	<sub>b</sub> 23	.02	.19
F	Crepis acuminata	3	-	-	-	-	-
F	Cryptantha spp.	2	2	-	-	-	-
F	Descurainia pinnata (a)	-	-	-	5	-	.01
F	Holosteum umbellatum (a)	-	-	-	3	-	.01
F	Lactuca serriola	-	1	-	-	-	-
F	Microsteris gracilis (a)	-	-	3	11	.00	.02
F	Petradoria pumila	-	-	5	3	.18	.15
F	Ranunculus testiculatus (a)	-	-	<sub>a</sub> 8	<sub>b</sub> 27	.01	.10
F	Streptanthus cordatus	-	6	-	3	-	.00
F	Tragopogon dubius	-	1	-	-	.00	-
F	Zigadenus paniculatus	2	-	-	4	-	.01
Total for Annual Forbs		0	0	68	94	0.24	0.40
Total for Perennial Forbs		9	25	8	14	0.21	0.23
Total for Forbs		9	25	76	108	0.46	0.64

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 21 , Study no: 10

Type	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Artemisia tridentata wyomingensis	71	44	9.01	4.99
B	Chrysothamnus nauseosus	1	0	-	-
B	Cowania mexicana stansburiana	13	10	1.46	2.71
B	Gutierrezia sarothrae	31	4	1.19	.00
B	Juniperus osteosperma	5	3	3.94	1.96
B	Leptodactylon pungens	3	2	.00	-
B	Opuntia spp.	1	1	-	.00
B	Purshia tridentata	2	6	-	2.54
B	Ribes spp.	1	0	-	-
Total for Browse		128	70	15.62	12.22

CANOPY COVER, LINE INTERCEPT --

Management unit 21 , Study no: 10

Species	Percent Cover	
	'98	'03
Artemisia tridentata wyomingensis	-	6.15
Cowania mexicana stansburiana	-	2.73
Juniperus osteosperma	2.79	3.31
Purshia tridentata	-	2.31

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 21 , Study no: 10

Species	Average leader growth (in)
	'03
Artemisia tridentata wyomingensis	1.3
Cowania mexicana stansburiana	2.8
Purshia tridentata	3.1

POINT-QUARTER TREE DATA --  
Management unit 21 , Study no: 10

Species	Trees per Acre		Average diameter (in)	
	'98	'03	'98	'03
Juniperus osteosperma	76	54	4.7	4.0

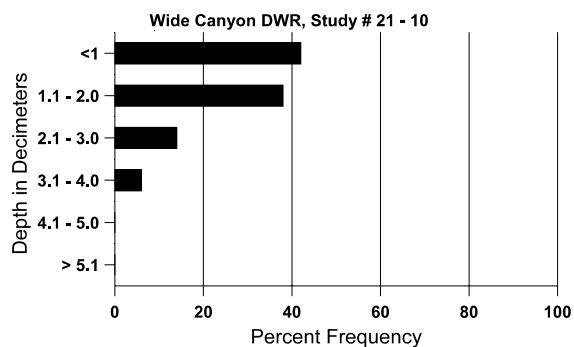
BASIC COVER --  
Management unit 21 , Study no: 10

Cover Type	Average Cover %			
	'85	'91	'98	'03
Vegetation	7.75	5.00	43.12	48.72
Rock	3.50	3.00	2.75	3.05
Pavement	12.50	3.75	2.53	4.41
Litter	62.00	66.25	57.06	48.25
Cryptogams	0	.25	1.15	1.19
Bare Ground	14.25	21.75	10.89	11.63

SOIL ANALYSIS DATA --  
Management unit 21, Study no: 10, Study Name: Wide Canyon DWR

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
10.4	70.0 (14.6)	7.0	36.7	34.7	28.6	2.6	9.7	92.8	1.0

## Stoniness Index



PELLET GROUP DATA --

Management unit 21 , Study no: 10

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Rabbit	52	23	-	-
Elk	1	1	3 (7)	-
Deer	53	45	122 (301)	165 (407)
Cattle	4	1	9 (22)	1 (4)

BROWSE CHARACTERISTICS --

Management unit 21 , Study no: 10

		Age class distribution (plants per acre)					Utilization				
Y	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<b>Amelanchier utahensis</b>											
85	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
91	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
98	<b>0</b>	-	-	-	-	20	0	0	-	0	-/-
03	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
<b>Artemisia tridentata wyomingensis</b>											
85	<b>2598</b>	-	466	1266	866	-	13	3	33	3	21/23
91	<b>2399</b>	-	133	1400	866	-	22	8	36	17	24/30
98	<b>2180</b>	-	20	920	1240	900	40	5	57	20	28/35
03	<b>1080</b>	-	-	520	560	800	41	15	52	20	30/34
<b>Chrysothamnus nauseosus</b>											
85	<b>0</b>	-	-	-	-	-	0	0	0	0	-/-
91	<b>0</b>	-	-	-	-	-	0	0	0	0	-/-
98	<b>20</b>	-	-	-	20	20	0	100	100	0	17/47
03	<b>0</b>	-	-	-	-	-	0	0	0	0	-/-
<b>Chrysothamnus viscidiflorus stenophyllus</b>											
85	<b>66</b>	-	-	66	-	-	0	0	-	0	11/12
91	<b>266</b>	-	133	133	-	-	25	0	-	0	12/14
98	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
03	<b>0</b>	-	-	-	-	-	0	0	-	0	23/22
<b>Cowania mexicana stansburiana</b>											
85	<b>132</b>	-	-	66	66	-	100	0	50	0	22/18
91	<b>133</b>	-	-	-	133	-	100	0	100	0	-/-
98	<b>260</b>	20	20	160	80	40	38	15	31	0	56/64
03	<b>200</b>	-	-	180	20	40	20	60	10	10	49/50

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Gutierrezia sarothrae</i>											
85	<b>3466</b>	-	800	2266	400	-	0	0	12	2	9/8
91	<b>800</b>	66	-	800	-	-	0	0	0	0	10/7
98	<b>1960</b>	20	120	1820	20	-	0	0	1	0	11/12
03	<b>100</b>	-	20	60	20	20	0	0	20	0	9/7
<i>Juniperus osteosperma</i>											
85	<b>0</b>	-	-	-	-	-	0	0	0	0	-/-
91	<b>0</b>	-	-	-	-	-	0	0	0	0	-/-
98	<b>100</b>	20	20	60	20	100	0	0	20	0	-/-
03	<b>60</b>	20	60	-	-	-	0	0	0	0	-/-
<i>Leptodactylon pungens</i>											
85	<b>132</b>	-	66	66	-	-	0	0	0	0	9/7
91	<b>66</b>	-	-	66	-	-	0	0	0	0	11/7
98	<b>140</b>	-	-	-	140	-	0	0	100	86	8/9
03	<b>80</b>	-	-	80	-	-	0	0	0	0	2/4
<i>Opuntia</i> spp.											
85	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
91	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
98	<b>20</b>	-	-	20	-	-	0	0	-	0	6/9
03	<b>20</b>	-	-	20	-	-	0	0	-	0	8/13
<i>Purshia tridentata</i>											
85	<b>0</b>	-	-	-	-	-	0	0	0	0	-/-
91	<b>0</b>	-	-	-	-	-	0	0	0	0	-/-
98	<b>40</b>	-	-	-	40	-	50	50	100	0	30/41
03	<b>140</b>	-	20	120	-	-	29	43	0	0	34/57
<i>Ribes</i> spp.											
85	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
91	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-
98	<b>20</b>	-	-	20	-	-	0	0	-	0	-/-
03	<b>0</b>	-	-	-	-	-	0	0	-	0	-/-